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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/549,585

12/01/2005

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F-8766

1212

28107 7590 09/15/2008
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EXAMINER

JOHNSON, KEVIN M

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

09/15/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/549,585	Applicant(s) HIRAYAMA ET AL.	
	Examiner KEVIN M. JOHNSON	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 6/19/2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status

1. Claims 1-13 are pending and presented for examination. Claims 1, 5 and 10 have been amended.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morihito et al. (JP 2000-144129) in view of Setoguchi et al. (JP 2003-336055).

In regard to claim 1, Morihito teaches a phosphorescent material comprising Eu as an activator, a coactivator that is preferably Nb and the host compound MAl_4O_7 , where M is Mg, Ca, Sr or Ba (abstract, claim 3). Morihito fails to teach that the material contains both Mg and Ba/Sr.

Setoguchi teaches a barium magnesium aluminate (BAM) phosphor material activated by Eu.

It would have been obvious to one skilled in the art at the time of the invention to utilize both Mg and Ba/Sr for M in the material taught by Morihito. Such a modification would have been motivated by the teaching in Morihito that Mg and Ba/Sr are functional equivalents and also in the teaching of Setoguchi that the common rare earth aluminate phosphor BAM contains both Ba/Sr and Mg.

In regard to claim 2, the material taught by Morihito is produced by firing a mixture of the precursor materials in a reducing atmosphere (claim 4). Morihito fails to teach a material that has been fired in an oxidizing atmosphere after being fired in a reducing atmosphere.

Setoguchi teaches a rare earth aluminate phosphor activated by Eu that is produced by mixing the precursor raw materials, firing the mixture in a reducing

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atmosphere, and then an oxidizing atmosphere is introduced for the last firing step (paragraph 70).

It would have been obvious to one skilled in the art at the time of the invention to utilize the process taught by Setoguchi to produce the material taught by Morihito. This modification would have been motivated by the teaching of Setoguchi that an additional firing under an oxidizing atmosphere increases the performance of alkaline earth metal phosphors activated with Eu.

In regard to claim 3, Morihito and Setoguchi fail to teach that the material containing Ba, Al, Mg, and Eu, in addition to Nb, Mo, Ta, W or Bi is made by a process in which the additive Nb, Mo, Tb, or Bi is added after an initial firing of a mixture of the other precursor materials. However, it is not clear that the time of the addition of the additive (Nb, Mo, Tb or Bi) imparts any unexpected results to the material, and therefore the material obviated by Morihito in view of Setoguchi is meets the requirements of the instant claim. Further, it would have been obvious to one skilled in the art at the time of the invention to alter the time of addition of the additive element as taught by Morihito to take place after an initial firing of the rest of the raw ingredients, but before firing in the reducing atmosphere, resulting in the same product. It is well established that the rearrangement of the order of steps in a process constitutes a case of *prima facie* obviousness in the absence of unexpected results (see MPEP 2144.04).

In regard to claim 4, Morihito teaches that the Nb content of the phosphor is between 0.0001 and 1 mole percent (paragraph 5).

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In regard to claim 5, Setoguchi teaches the material $\text{Ba}_{1-x-y}\text{Sr}_y\text{MgAl}_{10}\text{O}_{17}:\text{Eu}_x$ where $0.03 < x < 0.25$ and $0 < y < 0.25$ (paragraph 32). The material of the instant claim contains Ba in an amount of 0.56-1, Sr 0-0.3 and Eu 0-0.2, and the compound taught by Setoguchi comprises 0.5-0.97 Ba, 0-0.25 Sr and 0.03-0.25 Eu, where all values are moles/moles of Mg.

It would have been obvious to one skilled in the art at the time of the invention to modify the compound taught by Setoguchi with the addition of Nb, Mo, Ta, W, or Bi to form the material taught by Morihito. This modification would have been motivated by the teaching of Morihito that these additional components enhance the performance of alkaline earth metal aluminates activated with Eu.

In regards to claim 6, it would necessarily follow that the phosphor obviated by Morihito and Setoguchi would have a powder whiteness value of at least 85 as expressed in terms of W value.

In regards to claims 7 and 8, Morihito teaches a process for manufacturing an alkaline earth metal phosphor activated with Eu comprising the steps:

- a. Mixing the raw materials, including an additive component
- b. Firing the mixture in a reducing atmosphere

While Morihito does not teach the firing of the material in an oxidizing atmosphere after firing in a reducing atmosphere or the inclusion of both (Ba and/or Sr) and Mg, Setoguchi teaches the production of an alkaline earth metal aluminate phosphor comprising the steps of (paragraph 70):

- a. Mixing the raw ingredients including Ba, Sr, Mg, Al and Eu

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- b. Firing the raw ingredients in a reducing atmosphere
- c. Firing the resulting material in an oxidizing atmosphere

It would have been obvious to one skilled in the art at the time of the invention to combine the processes taught by Morihito and Setoguchi. This modification would have been motivated by the teaching of Setoguchi that subjecting alkaline earth metal phosphors activated with Eu to the required firing conditions improves the performance of the material, and the teaching of Morihito that an additive element in alkaline earth metal phosphors results in improved performance.

In regards to claim 9, Setoguchi teaches that prior to firing the material in a reducing atmosphere it is fired in air. It would have been obvious to one skilled in the art at the time of the invention that ambient air constitutes an oxidizing environment.

In regards to claim 10, Morihito teaches that after adding the additional element (Nb, Mo, Ta, etc.) to the mixture of the other precursor materials the mixture is fired in a reducing atmosphere. Setoguchi teaches a method that includes the additional firing of the material in air before the reducing atmosphere and firing in an oxidizing atmosphere after the reducing atmosphere. It would have been obvious to one skilled in the art at the time of the invention to alter the time of addition of the additive element as taught by Morihito to take place after an initial firing of the rest of the raw ingredients, but before firing in the reducing atmosphere, resulting in the same product. It is well established that the rearrangement of the order of steps in a process constitutes a case of *prima facie* obviousness in the absence of unexpected results (see MPEP 2144.04).

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In regards to claim 11, Morihito teaches that Nb, Mo, Ta, W and Bi are common additives to alkaline earth metal phosphors, and it would be therefore be obvious to include at least one of them in the fired product (abstract). It would further be obvious from the suggestion of Morihito that multiple additives may be selected from the list that additional additives could be added after the initial firing of the material to further improve the material.

In regards to claim 12, Morihito teaches that after adding the additive element(s) the mixture is fired in a reducing atmosphere, and therefore it would be obvious to one skilled in the art to fire the mixture in a reducing atmosphere after the additive elements have been added.

In regards to claim 13, it would be obvious to one skilled in the art that the material taught by Setoguchi could be fired in a reducing atmosphere before the addition of the additive element taught by Morihito. This combination would result in a process comprising the steps of:

- a. Mixing the raw ingredients including Ba, Sr, Mg, Al and Eu
- b. Firing the raw ingredients in a reducing atmosphere
- c. Adding the additive component to the fired material
- d. Firing the mixture in a reducing atmosphere
- e. Firing the resulting material in an oxidizing atmosphere

Such a modification would be motivated by the teaching of Morihito that the mixture is fired in a reducing atmosphere after the additive component is included, and the

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teaching of Setoguchi that the phosphor precursor mixture is fired in a reducing atmosphere before being fired in an oxidizing atmosphere.

Response to Arguments

Applicant's arguments filed 6/19/2008 have been fully considered but they are not persuasive.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the motivation for combining the references was found in the teaching of Setoguchi that firing alkaline earth metal aluminate phosphors activated with Eu, the type taught by Morihito, under a reducing and then oxidizing atmosphere improves the performance of the material. Further motivation to combine may be found in the teaching of Morihito that a coactivator additive, such as Nb, in addition to the Eu taught by Setoguchi improves the performance of alkaline earth metal aluminate phosphors.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., physical properties, such as afterglow) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the

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specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant's arguments with respect to claims 1 and 4 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

2. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEVIN M. JOHNSON whose telephone number is (571)270-3584. The examiner can normally be reached on Monday-Friday 7:30 AM to 5:00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on 571-272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jerry A Lorengo/
Supervisory Patent Examiner, Art Unit 1793

/Kevin M Johnson/
Examiner, Art Unit 1793